

CLAIMS

1. A legged mobile robot having at least a body and a plurality of legs each connected to the body through a first joint and each having a foot connected to a distal end of the leg through a second joint, comprising:

5 an elastic member installed at a position between the second joint and a floor contact end of the foot; and

 a displacement sensor installed in a space defined by a top-to-bottom height of the elastic member such that a displacement of the floor contact end of the foot relative to the second joint can be detected.

10

2. The robot according to claim 1, wherein a plurality of the elastic members are installed at the position between the second joint and the floor contact end of the foot, at separate locations viewed from top.

15

3. The robot according to claim 1 or 2, wherein the displacement sensor is housed in the elastic members such that the displacement of the floor contact end of the foot relative to the second joint can be detected.

20

4. The robot according to claim 1 or 2, wherein the displacement sensor is provided in vicinity of the elastic members such that the displacement of the floor contact end of the foot relative to the second joint can be detected.

25

5. The robot according to any of claims 2 to 4, wherein a plurality of the elastic members are located at an edge of the foot when viewed from top.

6. The robot according to any of claims 1 to 5, wherein the displacement sensor is housed in a sealed space.

5 7. The robot according to any of claims 1 to 6, wherein the displacement sensor comprises a spring and a pressure-sensitivity sensor.

10 8. The robot according to claim 7, wherein rigidity of the spring is set to be lower than that of the elastic member.

15 9. A legged mobile robot having at least a body and a plurality of legs each connected to the body through a first joint and each having a foot connected to a distal end of the leg through a second joint, comprising:

20 a plurality of displacement sensors installed in a space defined by a first rigid member connected to the second joint and a second rigid member connected to a floor contact end of the foot at locations spaced apart with each other when viewed from top, and producing outputs indicative of a displacement of the floor contact end of the foot relative to the second joint;

 a discriminator discriminating whether the outputs of the displacement sensors satisfy a predetermined geometric relationship; and

25 a self-diagnoser self-diagnosing whether at least one of the displacement sensors is abnormal based on a discrimination result of the discriminator.

10. The robot according to claim 9, wherein the geometric relationship is a relationship in which a value calculated from the outputs of the displacement sensors

located at opposite positions is a predetermined value.

5 11. The robot according to claim 10, wherein the predetermined value is zero or a value close thereto.

10 12. The robot according to any of claims 9 to 11, wherein a plurality of the elastic members are installed in the space defined by the first and second rigid members at separate locations when viewed from top, and the displacement sensors are each housed in the elastic members.

15 13. The robot according to any of claims 9 to 11, wherein a plurality of the elastic members are installed in the space defined by the first and second rigid members at separate locations when viewed from top, and the displacement sensors are installed in vicinity of the elastic members.

20 14. The robot according to any of claims 9 to 13, wherein the displacement sensors each comprises a spring and a pressure-sensitivity sensor.

25 15. The robot according to claim 14, wherein rigidity of the spring is set to be lower than that of an elastic member.

16. A floor reaction force detection system of a legged mobile robot having at

least a body and a plurality of legs each connected to the body through a first joint and each having a foot connected to a distal end of the leg through a second joint, comprising:

5 a displacement sensor installed at a position in or adjacent to an elastic member positioned between the second joint and the foot and producing an output indicative of a displacement of the floor contact end of the foot relative to the second joint; and

 a floor reaction force calculator calculating the floor reaction forces acting on the foot based on the output of the displacement sensor.